

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, Aug. 30-Sept. 3, 2010

Energy use flows downhill



Energy use in the United States fell nearly 5 percent last year, marking the largest annual drop on records dating back to 1949, the first year records were kept.

New energy flow charts from the Laboratory show that the total U.S. energy use fell in 2009 to an estimated 94.6 quadrillion British Thermal Units, down from 99.2 quadrillion BTUs in 2008. To put that in perspective, the average household annually uses about 95 million BTUs.

The last time energy use was this low was 1996, when it totaled 94.2 quadrillion BTUs.

"The increase in renewables is a really good story, especially in the wind arena," said A.J. Simon, an energy analyst at LLNL. "It's a result of very good incentives and technological advancements."

To read more, go to
http://money.cnn.com/2010/08/26/news/economy/energy_use/index.htm

Fizz fizz melts the ice



Foraminifera from core samples, examined while at sea.

By tracing the pathway of carbon dioxide release -- the same fizz that comes out of a soda when opened -- Lab researchers were able to determine that CO₂ release increased melting during the last ice age.

Using radiocarbon dating, Tom Guilderson, a Lawrence Livermore scientist and his colleagues, noticed that a rapid increase in atmospheric CO₂ concentrations coincided with a reduced amount of carbon-14 relative to carbon-12 (the two isotopes of carbon that are used for carbon dating and are referred to as radiocarbon) in the atmosphere.

"This suggests that there was a release of very 'old' or low ¹⁴/₁₂CO₂ from the deep ocean to the atmosphere during the end of the last ice age," Nature quoted Guilderson as saying.

Radiocarbon in the atmosphere is regulated largely by ocean circulation, which controls the sequestration of CO₂ in the deep sea through atmosphere-ocean carbon exchange. During the last ice age (approximately 110,000 to 10,000 years ago), lower atmospheric CO₂ levels were accompanied by increased atmospheric radiocarbon concentrations that have been credited to greater storage of CO₂ in a poorly ventilated abyssal ocean.

To read more, go to <http://sify.com/news/large-co2-release-accelerates-ice-age-melting-news-international-ki1q4gcheid.html>

Live from LLNL, it's...



Students in Christy Tyler's seventh-grade science class answer questions about carbon dating from John Knezovich and Karis McFarlane during a live broadcast from LLNL's Center for Accelerator Mass Spectrometry.

Scientists in the classroom. That's the name of the program that LLNL is offering in which scientists visit students via teleconference in classrooms in the San Ramon Valley Unified School District.

Dubbed "Scientists in the Classroom," this remote interactive pilot is a new educational project being developed by the Lab's Science Education Program (SEP) in collaboration with the San Ramon Valley Unified School District (SRVUSD) to help establish a model for the "Classroom of the 21st Century."

In the first session, Lab scientist John Knezovich, accompanied by postdoctoral researchers Karis McFarlane and Miranda Sarachine, explained the basics of mass spectrometry, a technology that has been used since early in this century to study the makeup of substances, highlighting how they use this tool to support their research at LLNL.

To read more, go to http://www.danvilleweekly.com/news/show_story.php?id=4069

Innovation Hub takes form



Alison Terrill, the Laboratory architect who led the effort to win green building certification for Bldg. 264.

Lawrence Livermore is a partner in a \$122 million U.S. Department of Energy (DOE) Energy Innovation Hub to develop technologies to make buildings more energy efficient.

The project is led by Pennsylvania State University.

The Energy Innovation Hub will be located at the Philadelphia Navy Yard Clean Energy campus, and will bring together 11 academic institutions, two DOE laboratories, five industry partners, regional economic development agencies, and community colleges to develop building designs that will save energy, cut pollution and position the United States as a leader in this industry.

Livermore's role will include building models that allow for rapid design, optimization, control, and analysis employing existing computational tools.

The mission is to research, develop and demonstrate efficient building components, systems and models applicable to both retrofit and new construction. Technologies include computer simulation and design tools to enable architects, engineers, contractors and building operators to work collaboratively on retrofit, renovation and new building design projects; advanced combined heat and power systems; building-integrated photovoltaic systems for energy generation; HVAC systems with integrated indoor air quality management; and sensor and control networks to monitor building conditions and optimize energy use.

To read more, go to http://www.elp.com/index/from-the-wires/wire_news_display/1252991664.html

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security,

meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The *Livermore Lab Report* archive is available at:
https://publicaffairs.llnl.gov/news/lab_report/2010index.html